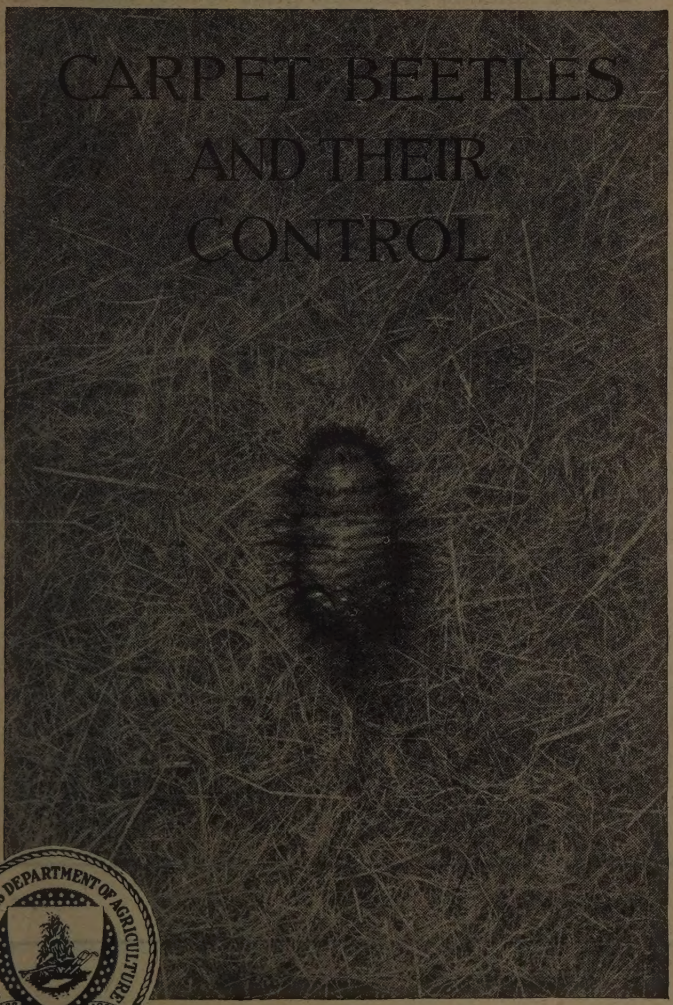
U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 1346

CARPET BEETLES AND THEIR CONTROL



CARPET BEETLES, or so-called "buffalo moths," are common household pests usually associated in their destructive work with clothes moths. Ordinarily they are not so destructive as clothes moths, because they reproduce only once a year, and then not so abundantly.

Experienced housewives throughout the North are familiar with the stout, oval, reddish-brown, hairy grubs or larvæ of the common carpet beetle, found beneath carpets or in clothing. In southern homes, however, the longer, slender, golden-brown larva of the black carpet beetle, with its tuft of golden bristles, is more common.

All carpet-beetle larvæ feed upon fabrics or upon various articles, including upholstered furniture, containing wool, silk, hair, fur, bristles, or feathers. They even feed upon dried animal matter.

Protection against carpet beetles can be secured in tight chests and trunks by the use of the crystals of naphthalene, paradichlorobenzene, or camphor, or by the fumigants carbon disulphid and carbon tetrachlorid. Where infestation is general throughout a house or is serious in closets, it may be advisable to fumigate with hydrocyanic-acid gas, carbon disulphid, or sulphur, but none of these fumigation methods should be employed except by a person well informed regarding them. The foregoing remedies and others, such as cold storage, red-cedar chests, heat, and the treatment of infested floor cracks, are discussed in this bulletin.

Washington, D. C. July, 1923

CARPET BEETLES AND THEIR CONTROL.

By E. A. Back, *Entomologist in Charge of Stored-Product Insect Investigations, Bureau of Entomology.*

CONTENTS.

	Page.		Page.
Carpet beetles or "buffalo moths"	1	Control measures—Continued.	
The common carpet beetle	2	Paradichlorobenzene	10
The black carpet beetle	4	Camphor	10
The varied carpet beetle	6	Red-cedar chests	11
The furniture carpet beetle	7	Cold storage	11
Control measures	9	Fumigation	11
Naphthalene	10	Miscellaneous control measures	12

CARPET BEETLES OR "BUFFALO MOTHS."

THE so-called "buffalo moths" are not moths; they are beetles and very distinct from the true clothes moths. In this country there are six species,[1] at least, that attack museum materials and household fabrics, but of these only four [2] have proved serious household pests in America. All species are capable of subsisting upon dried animal remains, and thrive upon them perhaps as well as upon the fine fabrics of wool, hair, feathers, fur, and silk.

Carpet beetles pass through life cycles, or generations, consisting of egg, larva or grub, pupa, and adult or beetle. These stages differ greatly in appearance. The beetles are broadly oval and about three-sixteenths to one-fourth of an inch long; black, but with this blackness often obscured by tiny red, orange, brown, yellow, or white scales which form color designs characteristic of the species. These scales, which are modified hairs, are easily rubbed off, revealing the black color of the body beneath. The larvæ, or grubs (as the larvæ of beetles are often called) are brownish or black and variously clothed with stiff hairs, as shown in Figures 1 and 8, or with a long tuft of hairs at the end of the body, as shown in Figure 5. Carpet beetles pass through not more than two generations annually, and more often only one, and there are records of certain individuals requiring much longer, even three years, to complete their growth. The following accounts are given of the four most important species.

THE COMMON CARPET BEETLE.[3]

The common carpet beetle was known as *the* carpet beetle in the years following its introduction into America when floors were more

[1] *Anthrenus scrophulariae* L., *A. museorum* L., *A. fasciatus* Hbst., *A. lepidus* LeC., *A. verbasci* L., and *Attagenus piceus* Oliv.

[2] *Anthrenus scrophulariae* L., *A. verbasci* L., *A. fasciatus* Hbst., and *Attagenus piceus* Oliv.

[3] *Anthrenus scrophulariae* L.

45402—23

commonly than now covered entirely with carpets that were tacked down along the edges, thus giving the larvæ an undisturbed shelter favorable to their development. Originally a pest in Europe, where it is still common, it was introduced into this country about 1874, probably at Boston and New York simultaneously. No stage of this common carpet beetle is longer than three-sixteenths to one-fourth of an inch. The general proportions of larva, pupa, and adult are

FIG. 1.—The common carpet beetle: *a*, Larva, dorsal view; *b*, pupa within larval skin; *c*, pupa, ventral view; *d*, adult. All enlarged (Riley.)

shown in Figure 1. The rich reddish brown larvæ are clothed with stiff dark brown hairs which are longer around the sides, and still longer at the ends, than upon the back.

The larvæ feed upon carpets and woolens (Fig. 2), furs, feathers (Fig. 3), bristles, and silks. They remain secluded in dark places, hidden beneath carpets or in the folds of garments. They eat irregular holes in fabrics, but in carpets tacked to floors they are more

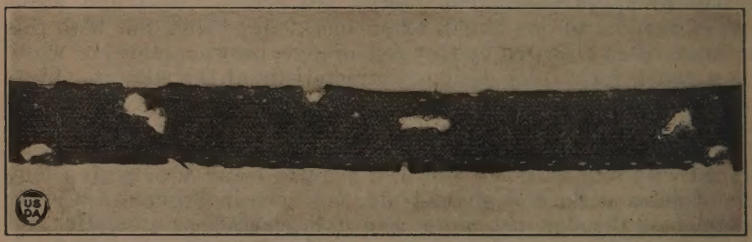


FIG. 2.—Typical carpet beetle damage to woolen cloth. For injury to feathers see Fig. 3.

likely to eat slits following cracks. They never cause a webbing on the fabric.

While most conspicuous in the Northern States, this carpet beetle is frequently found in the latitude of Washington, D. C., and southward. Specimens have recently been sent from Texas and Florida. In a Washington storehouse the contents of a trunk closed for several years were found badly damaged by the larvæ.

The following account [4] is just as applicable to-day as when written many years ago.

[4] Howard, L. O., in Bulletin 4, new series, Division of Entomology, United States Department of Agriculture, pp. 58–59. 1896.

The adult insect is a small, broad-oval beetle, about three-sixteenths of an inch long, black in color, but is covered with exceedingly minute scales, which give it a marbled black-and-white appearance. It also has a red stripe down the middle of the back, widening into projections at three intervals. When disturbed it "plays 'possum," folding up its legs and antennæ and feigning death. As a general thing the beetles begin to appear in the fall, and continue to issue, in heated houses, throughout the winter and following spring. Soon after issuing they pair, and the females lay their eggs in convenient spots. The eggs hatch, under favorable conditions, in a few days, and the larvæ, with plenty of food, develop quite rapidly. Their development is retarded by cold weather or lack of food, and they remain alive in the larval state, in such conditions, and particularly in a dry atmosphere, for an almost indefinite period, molting frequently and feeding upon their cast skins. Under normal conditions, however, the skin is cast about six times, and there are, probably, in the North,

FIG. 3.—Feathers damaged by fabric pests. Injury has been done here by clothes moths and carpet beetles. They reduce feathers to a mat-like mass.

not more than two annual generations. When the larva reaches full growth the yellowish pupa is formed within the last larval skin. Eventually this skin splits down the back and reveals the pupa, from which the beetle emerges later. The beetles are day fliers, and when not engaged in egg laying are attracted to the light. They fly to the windows, and may often be found upon the sills or panes. Where they can fly out through an open window they do so, and are strongly attracted to the flowers of certain plants, particularly the family Scrophulariaceæ, but also to certain Compositæ, such as milfoil (*Achillea millefolium*). The flowers of Spiræa are also strongly attractive to the beetles. It is probable, however, that this migration from the house takes place, under ordinary circumstances, after the eggs have been laid.

In Europe the insect is not especially noted as a household pest, probably owing to the fact that carpets are seldom tacked down. In fact, the writer believes that only where carpets are extensively used in this way are the conditions favorable for the great increase of this insect. Carpets once tacked down are seldom taken up for a year, and in the meantime the insect develops uninterruptedly. With the more general use of polished floors, and rugs which are

often taken up and beaten, there is little doubt that the "buffalo bug" will eventually cease to be a household insect of importance. The insect is known in Europe as infesting museums, but has not acquired this habit to any great extent in this country. It is known to have this habit in Cambridge, Mass., and Detroit, Mich., as well as in San Francisco, Calif., but not in other localities. In each of these three cases it was imported from Europe in insect collections.

THE BLACK CARPET BEETLE.[5]

The black carpet beetle derives its common name from the black, unadorned color of the adult. Its larva is reddish or golden brown, long and slender, with a characteristic tuft of long hairs at the end of its body. It curls up and "plays 'possum" when disturbed. A glance at Figure 5 will be sufficient for the identification of this unique carpet-beetle larva.

FIG. 4.—Black carpet beetle: Dorsal view of adult beetle. Greatly enlarged.

Widespread in Europe and Asia, it first attracted attention in America in 1854. Since then it has become widely distributed throughout the United States, often being the most injurious of the carpet beetles, especially in the more southern States. It is the carpet beetle most commonly referred by housewives to the department for identification. It feeds upon household fabrics of wool, feathers, fur, hair, and silk, and also upon cereals and cereal products, seeds, and dried animal remains, hence has many opportunities for existence in warehouses and barns as well as in houses.

The adult.—The adult of the black carpet beetle is small, oval, and black, as shown in Figure 4. The adults are present in abundance only during the early summer. In a steam-heated building at Washington, D. C., large numbers of adults were present late in April and during May, but became rather scarce during the first part of June, although single adults were found as late as early in July. The adult flies readily and is often seen crawling on window panes and screens. It is during the adult stage that the black carpet beetle spreads most easily from house to house.

The female beetle lays small, white, fragile eggs upon fabrics, in floor cracks, or in any sheltered spot near its food. The length of life of the parent insect ranges from 3 to 35 days during April, May, and June. Seldom are adults found later than July, except in very warm storage houses.

---

[5] *Attagenus piceus* Oliv.

The egg.—The fragile white eggs are very seldom seen, and hatch in warm weather in about 6 to 10 days.

The larva.—The golden brown larva, with short, stiff body hairs, and its long tuft of hairs at the end of the body (Fig. 5), attains a length of one-fourth of an inch, exclusive of the tuft of hair at the

FIG. 5.—Black carpet beetle: Larval skin showing the typical shape of the larva and the long tuft of bristles at the end of the body. Greatly enlarged.

end of the body. When first hatched it is almost microscopic in size, but increases rapidly under favorable food and climatic conditions. As it grows it sheds its skin from five to eleven times, and possibly oftener. This is of interest, for frequently the cast skins are mistaken for the insect itself, thus unnecessarily alarming the housewife concerning the abundance of this carpet beetle. It requires approximately one year for larvæ to become fully grown when fed upon casein. Larvæ hatching during early June and fed upon casein became full grown and transformed to the adult stage during the following April, May, and June. Larvæ fed upon woolen cloth and silk and flour and meal were still only partially grown at the end of one year, indicating that the black carpet beetle may require two years for its development. In India it has been found that certain of these larvæ may require from one to three years for growth.

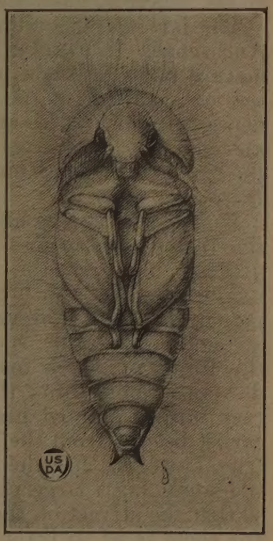


FIG. 6.—Black carpet beetle: Ventral view of pupa. Greatly enlarged.

The pupa.—In the pupa stage the insect is white, clothed with fine white hairs (Fig. 6), and helpless. The pupa stage continues from 6 to 16 days during early summer at Washington, D. C., and is seldom found at any other season of the year.

Seasonal history.—Since the greater part of the life cycle is passed in the larva stage, the facts previously mentioned indicate that the black carpet beetle may have only one generation each year, although it may require two or three years for the same development. From the observation of the writer, made in houses, warehouses, and in the laboratory at Washington, there seems little doubt that a very large percentage of the insects have one generation each year. Farther north, or under less favorable climatic

and food conditions, a generation may require two or even three years. At any rate, the adults are on the wing during early summer and the eggs for new infestations are laid then.

FIG. 7.—The varied carpet beetle: Dorsal view. Greatly enlarged.

THE VARIED CARPET BEETLE.[6]

The varied carpet beetle is similar in shape to the common carpet beetle,[7] but is a trifle smaller. It is called the "varied" carpet beetle because the color pattern on the back of the beetle varies considerably with the arrangement of the white, brownish, and yellowish scales. Figure 7 presents a common arrangement of the scales. The underside of the body is thickly clothed with white scales. This insect is a European pest now well established in widely separated parts of the United States. It has been found more often perhaps feeding upon seeds in museums than upon clothing, though its larvæ do attack woolen goods, feathers, hair, and silks.

The larvæ are not unlike other carpet beetle larvæ of the genus Anthrenus. In Figures 8 and 9 are shown the newly hatched and the mature larvæ. When unmutilated, they possess on each side at the end of the body three dense tufts of bristles and hairs. If suddenly alarmed, the larvæ erect these tufts and spread the bristles and hairs out so as to form beautiful round balls.

FIG. 8.—Varied carpet beetle: Dorsal view of newly hatched larva. Greatly enlarged.

During late spring and early summer, when the insect transforms to the adult stage in greatest numbers, the adults are driven by instinct to seek the bright sunshine and the pollen of certain flowers. In this respect they are not unlike other species of carpet beetles, the adults of which may be found also upon flowers. Some think that Viburnum or Spiraea bushes planted near the house will lure carpet beetles from the house. It is probably true, however, that the beetles, before leaving the house, lay a large percentage of their eggs, so that the attraction the sun and flowers have for them is of so little practical value to the householder that it is not worth while to depend upon flowers to lure the adults from the house.

The varied carpet beetle in the adult stage flies about in tremendous numbers. During May, 1922, the writer could capture them by the thousands upon at least 30 species of flowers found in public gardens in Washington, D. C. Single white roses often attracted

[6] *Anthrenus verbasci* L.
[7] *Anthrenus scrophulariae* L.

more than 100 beetles, while a single stalk of a common herbaceous Spiraea harbored more than 1,000 specimens. The beetles often fly in large numbers rather high above the ground. A gentleman [8] after painting a portion of the tin roof of his house during early May returned 24 hours later to complete the painting, only to find that during the interim an average of two varied carpet beetles to the square inch had become entangled in the fresh paint. The writer observed two adults fly into his city apartment in Washington through an open window during early March, 1922. These flights of adults are of extreme importance to the householder, because they emphasize how readily carpet beetles may spread from house to house during spring and early summer. Window screens will exclude all except the smallest specimens if they fit tightly, but the average removable screen does not fit tightly enough to prevent adult carpet beetles from crawling into the house between screen and window frame.

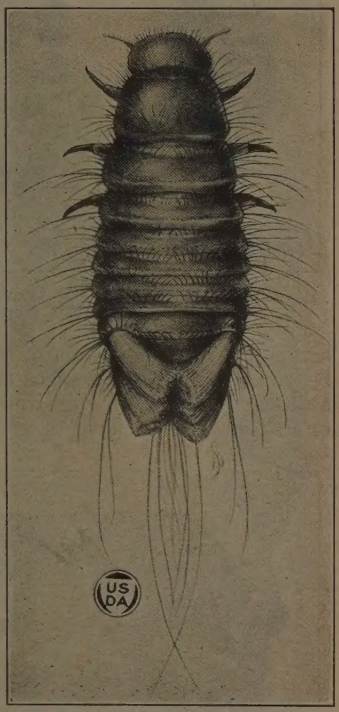


FIG. 9.—The varied carpet beetle: Dorsal view of well-grown larva. Greatly enlarged.

THE FURNITURE CARPET BEETLE.[9]

The carpet beetle or dermestid [10] here discussed has had no common name, but may be called the furniture carpet beetle (Fig. 10). It, too, is a European pest introduced into this country. It has been reported from Algeria, Spain, Greece, southern Russia, Mesopotamia, and the East Indies. It was first recognized in America during 1911, from specimens sent the American Museum of Natural History, New York City, from an upholsterer in Augusta, Ga. The specimens were taken from the curled hair of furniture upholstered 12 to 15 years previous to 1911. Investigation indicated that the hair used in this furniture came from Russia. The pest was not again noted in America until April, 1915, when it was found seriously damaging an upholstered chair in the White House. Since then, particularly during the last several years, many pieces of furniture and mattresses in different sections have been reported badly damaged.

In all instances the furniture was upholstered with curled hair and moss, and in some cases the hair had been completely devoured by the larvæ, in association with smaller numbers of the common carpet beetle, the black carpet beetle, and the webbing clothes moth. (Figs. 11 and 12.)

---

[8] H. S. Barber.
[9] *Anthrenus fasciatus* Herbst.
[10] So called because, like the other carpet beetles, it belongs to the family Dermestidae.

This beetle is now well established in this country and is a most serious furniture pest. The adults eat holes through heavy leather and linen coverings, while the larvæ reduce the hair used in the upholstering to a mass of cast larval skins and ground-up hair. The hair then has the appearance of black gritty dirt which can be

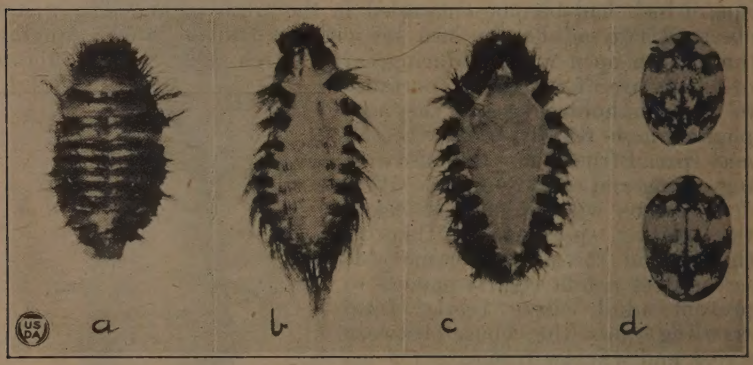


FIG. 10.—The furniture carpet beetle: *a*, Well-grown larva; *b*, larval skin; *c*, pupa within larval skin; *d*, two beetles.

scraped up by the handful, if not by the pailful. When the larvæ become abundant in a piece of furniture they may drop to the floor and there feed upon rugs and other fabrics made of wool, hair, fur, or feathers. The larvæ or grubs are seldom seen unless searched for,

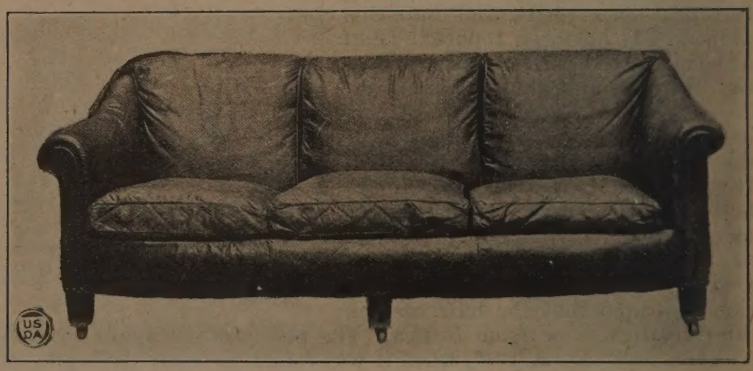


FIG. 11.—Upholstered furniture sometimes harbors thousands of clothes moths and carpet beetles without showing evidence of their feeding until they have become very abundant. From this couch thousands of adult carpet beetles were found emerging and spreading about the house. Only reupholstering or fumigation will rid such a piece of furniture of pests.

but the adults, because of their habit of flight during March to June (in Washington), leave the furniture and crawl about the furnishings and windows, and while hardly one-fourth of an inch long, are made conspicuous by the brown, white, and yellow scales that cover their bodies.

For a general impression of the appearance of the furniture carpet beetle see Figure 10. The adult may live several weeks. The female has been known to lay as many as 36 eggs in one day. Fortunately this species does not seem to be very prolific, since no adult has been known to lay more than 85 eggs. The eggs are small, white, easily crushed by brushing, and are laid in the nap of clothing. In furniture coverings of mohair, plush, and similar materials the eggs are tucked down in the pile, as shown in Figure 13. The eggs hatch during warm summer weather in from 12 to 15 days. The larvæ require the rest of the year for growth and do not transform to the adult until the following spring. The larvæ, however, do not all

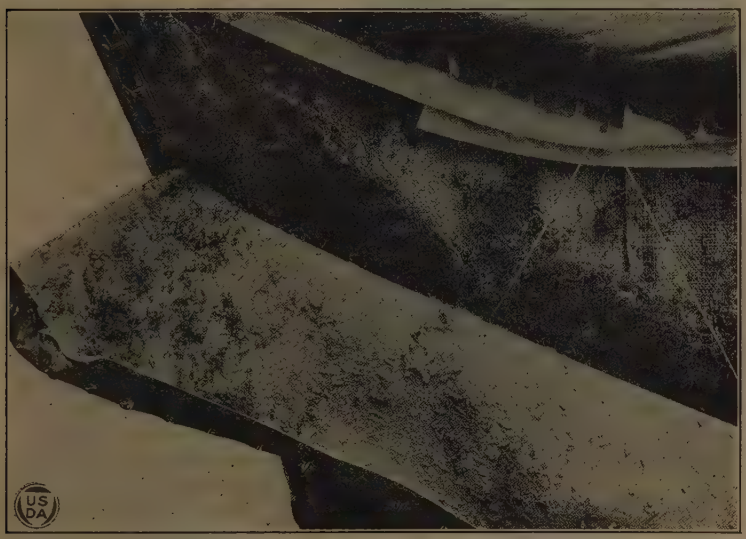


FIG. 12.—Leather covering at end of couch shown in Figure 11, loosened to expose the work of the furniture carpet beetle. Note that this pest, working with fewer numbers of clothes moths and black carpet beetles, has eaten nearly all the curled hair stuffing, leaving behind the moss used with the hair, countless larval skins, and handfuls of a fine, gritty, dirtlike substance which is nothing more nor less than the frass of the insect. Thousands of carpet beetles can mature in such furniture without the knowledge of the casual observer. It is only when the stuffing is eaten away and the pests leave the furniture and crawl about the house that suspicion is centered upon furniture as the possible source of an unending supply of clothes moths and carpet beetles that appear here and there about the house.

grow equally well, and some specimens may require only one year for development, while others may remain for considerable periods somewhat dormant, even in the presence of much food, and will not transform to the adult until much later, sometimes as long as one year after others, hatching on the same day, have matured.

CONTROL MEASURES.

The measures to be used for the control of carpet beetles depend upon the place in the house where the pest is causing injury. If carpet beetles are troublesome in trunks, chests, or closets that are not opened often, a good grade of flake naphthalene, paradichlorobenzene, or camphor will give good results. If the trouble is in closets

in daily use, beneath carpets or rugs, or in piano felts or upholstered furniture, these substances are of practically no value, and one must fumigate the house as a whole or in part with either hydrocyanic-acid gas, carbon disulphid, or carbon tetrachlorid, or use the still older, more tedious, and less effective means of control consisting in frequent search for and the killing of the individual larvæ and adults, and the treatment of floor cracks and similar hiding places with kerosene, gasoline, or benzine. The following materials and methods may be employed with satisfactory results:

FIG. 13.—Eggs of the furniture carpet beetle laid in the pile of a plush mohair covering of a chair. Considerably enlarged; the eggs are smaller than the head of a common pin and white in color.

NAPHTHALENE.

Naphthalene in the form of flakes (preferably) or moth balls is effective when used at the rate of one-half to 1 pound to each 10 to 13 cubic feet of space. It is always better to use a larger rather than a smaller quantity of these crystals. Great care should be exercised to keep tightly closed the trunks or chests of clothing with which the naphthalene is stored. Naphthalene in chests opened frequently or those carelessly left open for hours at a time, or in chests with large cracks or warped covers, is not to be depended upon. Naphthalene should be of good grade. It is best to purchase it put up in unbroken tin cans of 1 pound or more capacity. Remember that naphthalene kills all stages of the carpet beetles by means of the fumes given off during the slow evaporation of its crystals and it is essential that these fumes be closely confined. Naphthalene in bureau drawers, in closets frequently used, scattered upon closet shelves, or beneath carpets is not to be depended upon for absolute protection.

PARADICHLOROBENZENE.

Paradichlorobenzene crystals are similar in general appearance to those of naphthalene. The fumes given off by the slow evaporation of the crystals in a tightly closed container will kill all stages of the carpet beetle, if about 1 pound of crystals is used for each 10 cubic feet of space.

CAMPHOR.

Camphor is not as quickly effective against all stages of carpet beetles as are naphthalene and paradichlorobenzene. Its action is slower. Use from one-half to 1 pound for each trunk of about 10 cubic feet capacity.

RED-CEDAR CHESTS.

Chests made of red cedar, popularly known as Virginia[11] or Tennessee red cedar, if well constructed, will kill the very young larvæ of carpet beetles. They will not kill the beetles, the older larvæ, or the pupæ, nor will they prevent the eggs from hatching. The writer has known larvæ of the black carpet beetle[12] to remain apparently unaffected in a red-cedar chest from June of one year to May of the following year, and then to transform normally to the adult stage. The older larvæ of carpet beetles can be removed from clothing before it is stored in chests by thorough brushing. It is valuable to know that red-cedar chests will kill the very young larvæ. It should always be remembered that articles such as balls of yarn, floor skins backed with woolen cloth, pillows stuffed with hair or feathers, and similar objects in the interior of which the older carpet-beetle larvæ can hide should not be placed in cedar chests until fumigated to kill the larvæ hidden where they can not be reached by brushing.

COLD STORAGE.

One of the safest methods of preventing loss through carpet-beetle attack is to store susceptible articles with a reliable cold-storage firm maintaining rooms for such purposes at a temperature of 50° F. or lower.

FUMIGATION.

Carpet beetles, as well as all other household pests, can be eliminated as disturbing factors by fumigation within as short a time as three or four hours (if necessary). Fumigation with formaldehyde candles, although excellent for killing disease germs, is worthless for insect control, and the public is warned accordingly. Sulphur fumes will kill many carpet beetles, but very few persons succeed in killing all carpet beetles with sulphur fumes. Sulphur should be burned at the rate of 13½ ounces per 1,000 cubic feet of space. It is likely to bleach wall paper and fine fabrics and tarnish metals, and should never be used unless one is aware of these possible bad results.

Hydrocyanic-acid gas.—Hydrocyanic-acid gas is the best gas known and in present use for the fumigation of houses, or parts of houses, for the speedy elimination of carpet beetles or other pests. When persons are troubled with fabric pests that have become generally established throughout the house, nothing will give greater satisfaction in peace of mind and freedom from trouble than one thorough fumigation carried on by a professional fumigator or by any intelligent, careful person capable of following directions. Hydrocyanic-acid gas is dangerous to human beings, but is noninflammable and nonexplosive as used in household fumigation as here advocated. It is lighter than air, will injure no fabric or painting, and will not tarnish household metals. If properly used, it is one of the simplest and best methods of fighting house pests. Interested persons can have full particulars free of cost by writing the Division of Publications, Department of Agriculture, for Farmers' Bulletin 699.

---

[11] *Juniperus virginiana.*
[12] *Attagnus piceus.*

Carbon disulphid.—Carbon disulphid is a fumigant in general use for killing insects of all sorts in containers that are reasonably tight. It is excellent for killing carpet beetles in chests, trunks, and closets that can be closed and sealed. It has been used for the fumigation of entire buildings when these are detached. It is purchased at drug stores or of chemical firms as a liquid put up in tin cans containing 1, 2, 5, or 10 pounds each. Upon exposure to the air, the liquid evaporates, forming a gas heavier than air which sinks through the container being fumigated and kills the insects by suffocation. The gas is explosive in the presence of fire, and must be handled with the same care as gasoline or benzine. Although the liquid as purchased is considered not explosive or inflammable, great care should be exercised in storing and handling it since it is almost impossible to dissociate it from its gas, which is, as stated above, decidedly explosive and inflammable in the presence of fire. The odor of carbon disulphid gas is very disagreeable, but soon disappears with the airing of the container after fumigation. Carbon disulphid fumigation is excellent for the destruction of carpet beetles in articles that can be stored in trunks, chests, or closets, or for killing pests in pianos and upholstered furniture that can be placed in a small room for the period of fumigation. Full particulars regarding this fumigant and the ease with which it can be used may be had by writing the Division of Publications, Department of Agriculture, for Farmers' Bulletin 799.

Carbon tetrachlorid.—Carbon tetrachlorid is used in exactly the same way and for the same purpose as carbon disulphid, except that from two to three times as much of the liquid must be used to fumigate the same amount of space. Carbon tetrachlorid is not a particularly effective fumigant, but it has the advantage of producing, upon evaporation, a gas that is noninflammable and nonexplosive, and for this reason can be used in certain places where lighted lamps, fires, etc., can not be entirely eliminated. See Farmers' Bulletin 799 for reference to use of carbon tetrachlorid and carbon disulphid.

MISCELLANEOUS CONTROL MEASURES.

Laundering and dry cleaning.—When material infested with carpet beetles is submerged in a solution of 1 pound of neutral soap to 10 gallons of water all stages of the beetles are killed. Carpet-beetle larvæ are killed if subjected to temperatures of 120, 125, and 128° F. for 30, 15, and 10 minutes, respectively. Eggs are killed when subjected to temperatures of 125 and 130° F. for 16 and 11 minutes, respectively. Eggs and larvæ were killed in material dipped for 5 seconds in water at 140° F., but submergence for the same period in water at a temperature of 122° F. failed to kill all of them. Translated into household terms this means that laundering clothing or other textiles in thick suds or with water hotter than the hand can bear, or pressing with a hot iron, will probably kill the larvæ and eggs of the carpet beetle. The usual commercial dry-cleaning processes also are probably effective. Unfortunately these methods are not always easily applied to the articles most likely to be infested; they must not be considered a preventive against reinfestation.

Treatment of floor cracks and other hiding places.—Carpet-beetle larvæ often secrete themselves in the cracks of flooring, beneath base boards, and in other openings about houses formed by the usual shrinking or settling of woodwork. The larvæ feed upon the lint which gathers in such places. It is, therefore, an excellent procedure to have all such openings closed where possible by filling in with putty or patented crack-fillers. Any cracks that can not be filled in this manner should be periodically filled with gasoline, kerosene, or benzine to kill larvæ. Since these liquids are inflammable, care must be exercised not to have lighted lamps or fire in any form about until after the rooms are well ventilated.

ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE.

Secretary of Agriculture	HENRY C. WALLACE.
Assistant Secretary	C. W. PUGSLEY.
Director of Scientific Work	E. D. BALL.
Director of Regulatory Work	
Weather Bureau	CHARLES F. MARVIN, *Chief.*
Bureau of Agricultural Economics	HENRY C. TAYLOR, *Chief.*
Bureau of Animal Industry	JOHN R. MOHLER, *Chief.*
Bureau of Plant Industry	WILLIAM A. TAYLOR, *Chief.*
Forest Service	W. B. GREELEY, *Chief.*
Bureau of Chemistry	WALTER G. CAMPBELL, *Acting Chief.*
Bureau of Soils	MILTON WHITNEY, *Chief.*
Bureau of Entomology	L. O. HOWARD, *Chief.*
Bureau of Biological Survey	E. W. NELSON, *Chief.*
Bureau of Public Roads	THOMAS H. MACDONALD, *Chief.*
Fixed Nitrogen Research Laboratory	F. G. COTTRELL, *Director.*
Division of Accounts and Disbursements	A. ZAPPONE, *Chief.*
Division of Publications	EDWIN C. POWELL, *Acting Chief.*
Library	CLARIBEL R. BARNETT, *Librarian.*
States Relations Service	A. C. TRUE, *Director.*
Federal Horticultural Board	C. L. MARLATT, *Chairman.*
Insecticide and Fungicide Board	J. K. HAYWOOD, *Chairman.*
Packers and Stockyards Administration *Grain Future Trading Act Administration*	CHESTER MORRILL, *Assistant to the Secretary.*
Office of the Solicitor	R. W. WILLIAMS, *Solicitor.*

This bulletin is a contribution from

Bureau of Entomology	L. O. HOWARD, *Chief.*
Stored-Product Insect Investigations	E. A. BACK, *Entomologist in Charge.*

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
5 CENTS PER COPY

PURCHASER AGREES NOT TO RESELL OR DISTRIBUTE THIS COPY FOR PROFIT.—PUB. RES. 57, APPROVED MAY 11, 1922

▽

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1922